U.S. Department of Transportation
**Federal Highway Administration**

DRAFT

# TravelTIP Project

## Evaluation Approach

**Southern California ITS Priority Corridor Showcase Program**

**March 20,1998**

***Prepared by: Booz*Allen & Hamilton***

# DISCLAIMER

The purpose of this document is to provide a high level overview of the project and its evaluation. This document will be updated on a regular basis, as new information becomes available. All information provided in this document is believed accurate and current, but is not guaranteed.

## CONTENTS

## THE TRAVELTIP PROJECT WILL BE THE INITIAL EARLY START SHOWCASE PROJECT IN THE ORANGE COUNTY REGION

- The goal of the TravelTIP project is to enhance the use of existing transportation infrastructure, by providing travelers with route, mode, and time of day options when traveling in or through Orange County.
- The TravelTIP project is the Showcase Program model for management of data fusion for Advanced Traveler Information Systems (ATIS). TravelTIP will be the *information engine' to the Orange County Model Deployment Initiative (OCMDI) project, another Showcase project.
- TravelTIP services are primarily aimed at residents, employees, and through travelers. In addition to numerous business districts and retail centers, Orange County includes diverse trip generators such as the John Wayne Airport, University of California at Irvine, beach cities, Disneyland and other leisure attractions.

## THE ORANGE COUNTY REGION'S TRANSPORTATION INFRASTRUCTURE PLAYS AN IMPORTANT ROLE IN THE PRIORITY CORRIDOR AS WELL AS IN THE COUNTY

- Interstate Routes 5 and 405 extend from the north-west to the south-east of Orange County, linking Los Angeles'with San Diego.
- Amtrak (San Diegan Route) and Metrolink commuter rail (Orange County Line) services operate in parallel with these routes, with seven rail stations on the Orange County Line in Orange County.
- State Routes 22 and 91 provide east-west links across the county, while State Routes 55 and 57 provide north-south links across the county.
- Metrolink also provides service between Irvine and Riverside/San Bernardino, in parallel with SR-55 and SR-91.
- The John Wayne Airport is located at the southern end of SR-55, near its intersection with I-405.

## THE TRAVELTIP PROJECT FUSES DATA FROM MULTIPLE SOURCES AND DISSEMINATES IT TO PUBLIC AND PRIVATE USERS AS STATIC AND DYNAMIC TRANSPORTATION INFORMATION

- TravelTIP will initially interface with:
  - four Transportation Management Centers (TMCs), located at Caltrans/CHP District 12, City of Anaheim, City of Santa Ana, and City of Irvine
  - arterial traffic signal systems
  - Orange County Transit Probe System
- Data sources for TravelTIP include traffic signal master controllers at 60 arterial locations, freeway mainline and ramp meter loops, transit probes, and incident and traffic advisories provided by participating agencies.
- Initially, the City of Anaheim will not provide data to TravelTIP, pending completion of current system development efforts.
- Static information will include transit schedules and fares, construction activity, and special events. Dynamic information will include traffic congestion, and transit schedule adherence for selected routes.
- TravelTIP is not a transportation management tool, but could facilitate transportation management through the provision of such information. The TravelTIP Operator will not interface directly with the traveling public.

## TRAVELTIP WILL PROGRESSIVELY EXPAND TRAVELER INFORMATION DISSEMINATION OUTLETS

- TravelTIP will initially disemminate traveler information through:
  - four kiosks locatedat the Fullerton Transportation Center, the Santa Ana Transit Terminal, the Irvine Transportation Center, and a location in the City of Anaheim,
  - a telephone advisory service,
  - a web-site,
  - remote workstations at participating agencies.
- The OCMDI project will substantially enhance data dissemination through the private sector partners. These partners will provide information through specific products and services not currently identified for TravelTIP.
- TravelTIP will test a business model for traveler information developed by the Southern California Economic Partnership, as part of the statewide Smart Travel initiative.

## THE TRAVELTIP PROJECT ENTAILS THE IMPLEMENTATION OF AN OPEN, FLEXIBLE, MODULAR, AND COST-EFFECTIVE SYSTEM

The TravelTIP system is comprised of two elements:

- A base system, which will interface with all TravelTIP external elements. Initially, this will be located at the System Integrator's offices. In the longer term, this may be located at the Caltrans District 12 TMC.
- The sensor/communication field infrastructure, which will fill high priority information gaps within Orange County. Target areas include:
  - County of Orange (covers the jurisdictions of Orange County, Cities of Dana Point, Laguna Niguel, and Lake Forest)
  - Cities of Fountain Valley, Costa Mesa, Newport Beach, and Mission Viejo in the south of the County
  - Cities of Westminster, Garden Grove, Orange, and Tustin in the middle of the County
  - Cities of Buena Park, Fullerton, and Brea in the north of the County

## THE TRAVELTIP PROJECT IS RELATED TO OTHER SHOWCASE PROGRAM CORRIDOR-WIDE AND REGIONAL PROJECTS

- SHOWCASE Program (funded projects)
  - Orange County MDI*
  - Corridor-wide Advanced Traveler Information System*
  - Inter-regional Rideshare Data Base Linkage*
  - Fontana-Ontario ATMIS Corridor (Inland Empire)*
  - Regional Advanced Traveler Information System (LAA/entura)*
- SHOWCASE Program (unfunded projects)
  - John Wayne Airport Area Coordinated Management
  - Regional Advanced Traveler Information System (San Diego)
- Other
  - Orange County Transit Probe System

Note: Projects indicated with a (*) are included in the Showcase Program Evaluation Strategy
The Transit Probe project will equip 15 fixed route buses with global positioning system (GPS) devices, to provide real time bus location data.

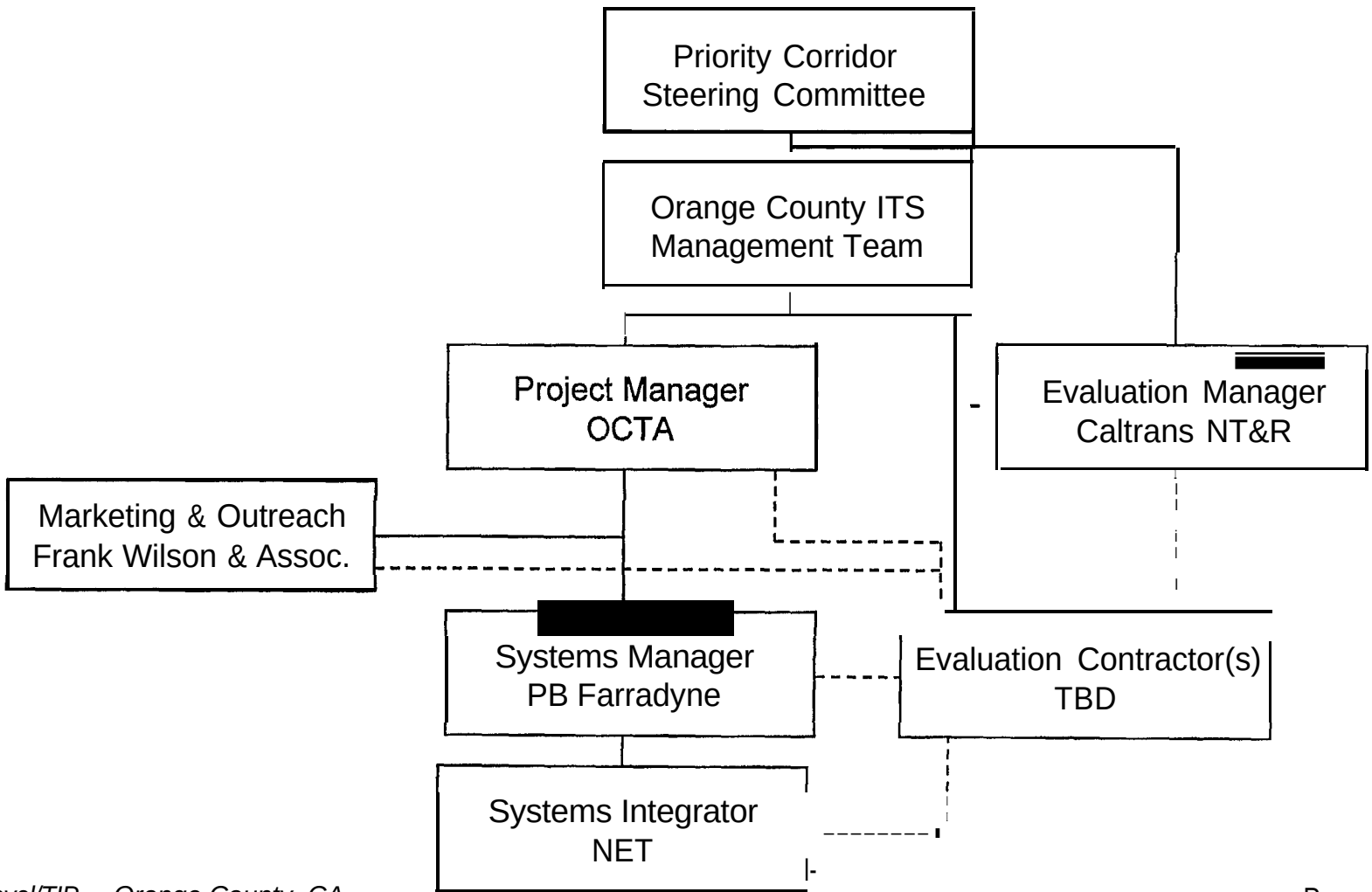
# THE TRAVELTIP PROJECT USES A RANGE OF SYSTEMS AND MARKET PACKAGES

| SYSTEMS | MARKET PACKAGES |
|---|---|
| • Caltrans District 12 ATMS (existing)<br>• City of Anaheim TMC<br>• City of Irvine TMC<br>• City of Santa Ana TMC<br>• Arterial Signal Systems (Multisonics and Econolite) | • Network Surveillance<br>• Incident Management System<br>• Transit Vehicle Tracking<br>• Transit Fixed-Route Operations<br>• Demand Response Transit Operations<br>• Transit Passenger & Fare Management<br>• Broadcast Traveler Information<br>• Interactive Traveler Information<br>• Dynamic Route Guidance<br>• ISP based Route Guidance |

# THE TRAVELTIP PROJECT WILL OPERATE AT SHOWCASE LEVEL TBD FOR CENTER TO CENTER INTEGRATION OF ADVANCED TRAVELER INFORMATION SYSTEMS (ATIS)

- The SHOWCASE Program identified four possible levels of Center to Center integration for ATIS:
  - Level 1: Fully distributed - loosely coupled - Internet paradigm.
  - Level 2: Fully distributed - tightly coupled - formal configuration management.
  - Level 3: Hierarchical with distinct fusion or assimilation and dispersion points
  - Level 4: Centralized Travel Information Center for Priority Corridor.
- TravelTIP will operate at Level TBD.

# THE PROJECT TEAM IS LED BY THE ORANGE COUNTY TRANSPORTATION AUTHORITY (OCTA) - OTHER ORGANIZATIONAL LINKAGES ARE PROVISIONAL



## THE TRAVELTIP PROJECT HAS SEVENTEEN PARTICIPATING AGENCIES

- OCTA (Sponsor)
- Caltrans District 12
- City of Anaheim
- City of Irvine
- City of Santa Ana
- County of Orange
- and the eleven cities listed on page

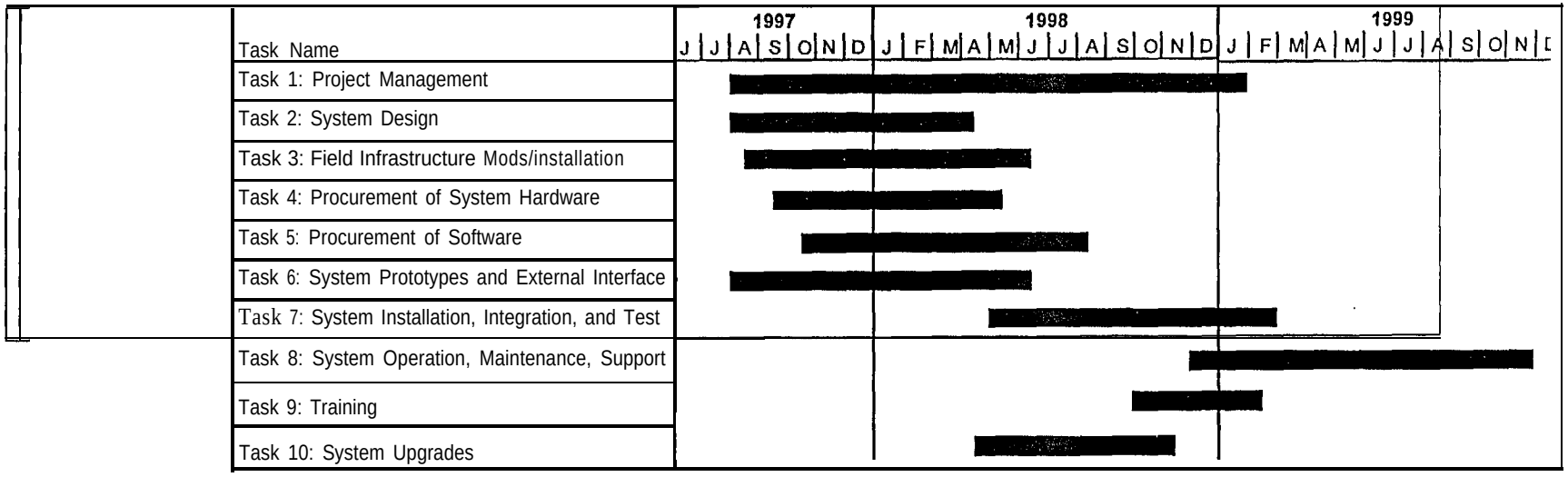
- Because TravelTIP is the Showcase model for ATIS, and potentially for the State also, other State and local agencies participate in TravelTIP from time to time.

## THE TRAVELTIP SYSTEM INTEGRATOR WORKPLAN IS COMPRISED OF TEN MAJOR TASKS

- Task 1.0-Project Management
- Task 2.0-System Design
- Task 3.0-Field Infrastructure Modification/Installation
- Task 4.0-Procurement of System Hardware
- Task 5.0-Procurement of Off-The-Shelf Software and Development of Custom Software
- Task 6.0-System Prototypes and External Interfaces
- Task 7.0-System Installation, Integration, and Test
- Task 8.0-System Operation, Maintenance and Support
- Task 9.0-Training
- Task 10.0-System Upgrades

**Note:** Separate Workplans exist for the System Manager and Marketing & Outreach Consultants

## CURRENT PROJECT SCHEDULE:




Notes: Needs Assessment and High Level Design have been completed under a previous contract

## THE EVALUATION APPROACH FOR TRAVELTIP IS BASED ON FIVE EVALUATION GOALS DEVELOPED FOR THE SHOWCASE PROGRAM

* Evaluation Goal #1: Assess the performance of the Showcase Program systems
* Evaluation Goal #2: Estimate the costs of the Showcase Program
* Evaluation Goal #3: Assess the institutional impacts of the Showcase Program
* Evaluation Goal #4: Assess the impact of the Showcase Program on management of transportation and traveler information
* Evaluation Goal #5: Evaluate selected transportation system impacts of the Showcase Program projects, including improvements arising from Showcase Program integration

# INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE

| EVALUATION OBJECTIVES | MEASURES |
|---|---|
| 1 1 Document the Showcase Program system development process, including configuration management | 1.1.1 Document |
| 11 Assess overall system reliability, availability, interoperability, compatibility, ease of use, and scaleability | 1.2.1 System Mean-Time-Between-Failures (Failure Defined)<br>1.2.2 System Availability Equation ("Up Time" and "Down Time" defined)<br>1.2.3 Degree of System Interoperability as Provided by agency personnel<br>1.2.4 Assess level of compatibility in physical and operational environment by transportation agency technical staff<br>1.2.5 Estimate of system ease of use by transportation agency **technical staff**<br>1.2.6 Estimate of Scaleability by transportation aaencv technical staff |
| 1.3 Assess how Showcase Program integration affected deployment of individual Showcase Program projects and their system performance | 1.3.1 Document |
| 21 Estimate the costs associated with the Showcase Program's "Design Once/ Deploy Often" Philosophy | 2.1.1 Actual costs of systems versus estimated costs based on "initial Design Principle" and comparable projects elsewhere |
| 2.2 Estimate Showcase Program operations & Maintenance (O&M) costs | 2.2.1 O&M costs annually, based on actual costs six months after system operation start-uo |
| 3.1 Identify the impact of the Showcase Program on the O&M procedures and policies of the participating transportation agencies | 3.1.1 Document |
| 3.2 Identify the impact of the Showcase Program on staffing/skill levels and training | 3.2.1 Number of O&M staff changes required and/or requested<br>3.2.2 Estimated and/or actual system training time and costs<br>3.2.3 Number of additional job classifications created<br>3.2.4 Chanae in emulovee turnover rate |

# INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

| EVALUATION OBJECTIVES | MEASURES |
|---|---|
| 3.3 Document the impacts of emerging standards and a single high level designer concept on the competitive environment | 3.3.1 Number of qualified and responsive proposals to system development RFPs<br>3.3.2 Magnitude of schedule and cost variation in system development<br>3.3.3 Document number of standards implemented<br>3.3.4 Number of different firms selected |
| 3.4 Document participation by the private sector in the management of transportation and traveler information | 3.4.1 Number of private companies involved in Showcase transportation and traveler information management<br>3.4.2 Number of private company personnel involved in Showcase transportation and traveler information management |
| 3.5 Assess the impact of the Showcase Program on local planning processes, policy development, and mainstreaming of ITS projects | 3.5.1 Assess the impacts of the Showcase Program deployment plans on the local planning process, as perceived by SCAG and SANDAG planners |
| 4.1 Assess the extent of regional and inter-regional transportation and traveler information integration between agencies | 4.1.1 Increased information exchanges<br>4.1.2 Communications improvements, based on information integration, as perceived by agency personnel<br>4.1.3 Number of new ITS systems architecture data flows implemented |
| 4.2 Assess the utilization of regional and inter-regional transportation and traveler information by agencies | 4.2.1 Enhancement of transportation agency performance due to utilization of regional and inter-regional transportation and traveler information, as perceived by agency personnel |
| 4.3 Assess the extent to which comprehensive and seamless traveler information was disseminated to, and used by travelers, including the relative effectiveness of different dissemination technologies | 4.3.1 Indications of seamless access and favorable response by users<br>4.3.2 Indications of ease of access by travelers |

# INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

| EVALUATION OBJECTIVES | MEASURES |
|---|---|
| 5.1 Assess mode shift and intermodal impacts | 5.1. 1 Increase in ridership of public transit in target areas<br>5.1 .2 Increase in traveler tendency to consider mode shift during target time periods |
| 5.2 Assess the safety related impacts of the Showcase projects | 5.2.1 Decrease in frequency and severity of accidents in target areas during target time periods<br>5.2.2 Increase in perceived safety benefits by travelers |
| 5.3 Assess the impacts of the Showcase Projects on traffic congestion | 5.3.1 Decreases in delay in target areas during target time periods<br>5.3.2 Increases in average speed in target areas during target time periods<br>5.3.3 Decreases in number of stoos |
| 5.4 Assess the environmental impacts of the Showcase Proaram | TBD - please refer to the Cross-cutting Analysis Strategy document |
| 5.5 Assess the impact of the Showcase Program on transit operations | 5.5.1 Increases in ridership and length of trip attributable to Showcase projects<br>5.5.2 Increases in operational efficiency in targeted areas<br>5.5.3 Reduction in selected operations costs<br>5.5.4 Number of staffing changes required |
| 5.6 Not applicable to TravelTIP | 5.6.1 Not applicable to TravelTIP<br>5.6.2 Not applicable to TravelTIP |

# EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS

* System Development and Performance
  - Document significant project technical development events, decisions, and trends
  - Examine system component (hardware and software) technical performance characteristics
  - Assess project development as part of the overall Showcase Program system integration
* Cost Assessment
  - Document and estimate project cost, based on publicly available data
  - Estimate project cost without the benefit of prior designs
  - Estimate project O&M costs, based on a minimum of 6 months of operations cost data

# EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Institutional Impacts
  - Document the impacts and consequences of O&M policy and procedural changes to participating transportation agencies
  - Document the requirements for changes in staffing and skills training, and the consequences
  - Document the impacts of emerging standards and a single high-level design concept on the competitive environment
  - Document and assess the impacts on motor carrier management of operations and administration

* Management of Transportation and Traveler Information
  - Investigate and assess the level and relative magnitude of inter-regional information that results,from the project (output and input)
  - Determine the level and relative magnitude of utilization of regional information by the project and from the project

# EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

➢ Transportation System Impacts

- Identify and assess traffic congestion impacts at targeted areas and during targeted times
- Identify and assess the degree of travel mode shifts or other changes in intermodal travel behavior
- Determine, if possible, any marginal air quality benefits directly measurable from the project
- Identify and assess transit operations and ridership changes for targeted areas and times
- Identify and assess any safety benefits directly or indirectly attributable to the system

# DATA COLLECTION SOURCES HAVE BEEN IDENTIFIED

* Existing sources
  - Caltrans District 12, volume and occupancy data, collected every 30 seconds, at half mile intervals, and used to calculate average speed
  - OCTA Transit Probe - TBD
  - All other agencies controlling traffic signal systems - TBD
* New sources
  - TravelTIP

# ACTIVITIES EXTERNAL TO THE PROJECT WHICH MAY INFLUENCE DATA COLLECTION HAVE BEEN IDENTIFIED

* Construction
  - Roadwork activity is underway on Interstate-5 in Orange County, near the Los Angeles County Line. Completion is planned in phases between April 1999 and March 2001.
  - HOV lane construction on Interstate-605 south of State Route-91 in Los Angeles County, to the Orange County Line, is planned for April 1999 through July 2000.
  - SR-91 (SR-57 to I-5) widening is underway
  - SR-55 (SR-22 to SR-91) widening starts in 1998/99
  - El Toro Corridor (SR-91 to Jamboree/I-5) is underway
  - Katella Avenue (Anaheim) widening (I-5 to Harbor)
* Other
  - Disneyland Expansion
  - Amtrak service Expansion
  - Construction of two commuter stations (Laguna Niguel/Mission Viejo and Tustin)
  - Bus service changes

# AGENCY DATA ARCHIVAL POLICIES

* TravelTIP will archive data pertaining to:
  - advisories
  - special events
  - system status
  - diagnostics
* TravelTIP will NOT archive data which **is already archived by other** agencies
* Caltrans District 12 data archived for 12 months (by Caltrans)
* All other agencies controlling traffic signal systems do not archive traffic data
* OCTA Transit Probe - TBD